Irrigated Organic Vegetable Production: Urban Soil Health Mgt. System

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Improving Soil Health on Urban Farms

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http://www.conservationwebinars.net/webinars/improving-soil-health-on-urban-farms

- Urban farm (in the middle of Albuquerque, NM)
- Cultivating 3.5 acres
- Mixed vegetables, cover crops, peach orchard
- Certified organic
- Surface water from canal
- Well water for drip tape

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It’s all about the microbes!
Bacteria, Fungi, Protozoa and Nematodes

- Plants evolved with soil microbes
- Microbes break down minerals and organic matter to be available to plants
- Minimal soil disturbance allows microbes to grow in the soil
- Cover crop residue & exudates provides food for microbes
Guiding Principles for Improving Soil Health
Using a Soil Health Management System

1. Grow a crop on all the land at all times

2. Grow many different crops in diverse rotations

3. Disturb the soil as little as possible
Photos illustrate farm practices that improve the soil

1. Soil health improvement activities

2. Habitat for pollinators and wildlife

3. Farm infrastructure development

4. Pest and weed management

5. Soil nutrient management

6. Water management
1. Soil Health Improvement Activities

**Practice: Cover crops**

- **Field mix:**
  - medium red clover, alfalfa, white clover, hairy vetch, native wildflowers

- **Mix of annuals and perennials**
- **Fall planted**
- **Flail mow and regrow**
- **Incorporate early spring**
- **Residue is food for microbes**
- **Cool season mix**

- **Follows cash crop**

Why? **Holds moisture, pollinator habitat, increase organic matter, prevents erosion**
1. Soil Health Improvement Activities

Practice: Cover crops

Why? As a BIO FARMER we always grow 2 crops: one for us, one for the microbes

- Permanent orchard understory
- Provides nutrients for trees
- Mowed, remains on ground
- Mix of clovers, vetch and ryegrass

- Portion is not mowed
- Reseeds itself
- Attracts Bees
- Increased pollination

NRCS Practice # 327: Conservation Cover Crop
1. Soil Health Improvement Activities

Practice: Cover crops

- Cover crops RESTORE depleted soils

NRCS Practice # 328: Conservation Crop rotation

Field mix:
- Sudangrass,
- Sorghum/Sudan,
- Red clover.
- Winter wheat

- First crop after laser leveling field
- Mix of grasses and legumes
- 3 years cover crop only
- Nothing removed from land

- Cover grows 6’ tall
- Mowed, allowed to regrow
- Left on ground, NOT incorporated

Why? Cover Crops RESTORE depleted soils
1. Soil Health Improvement Activities

Practice: Rotate cash row with alley row every 3 years

• Alleyways planted in cover crop to enrich the soil
• Low growing Dutch white clover

Why? We build soil fertility in alley rows by planting cover crops
1. Soil Health Improvement Activities

Practice: Reduced tillage implements

Why? Less soil disturbance improves microbe population
1. Soil Health Improvement Activities

Practice: Cover crops in alley rows

- Using a soil aerator in alley row
- Opens up soil for reseeding
- Narrow width perfect for alley row

Why? This year’s alley row is next year’s cash row (we rotate every three years)

- Hand broadcasting in alley row
- Red/white clover
- Increases soil nitrogen
Practice: Cover crops in cash row

- Fall planted cover crop
- Planted in cash row, after harvesting cash crop
- Legume, grain, radish mix

- Mowed down in spring

- Residue remains on the ground
- Residue tilled in 2 weeks prior to planting cash crop
- Residue breaks down and feeds the microbes

Why? Fall cover crops in cash row improves soil for spring planting of vegetables
1. Soil Health Improvement Activities

Practice: Single shank deep tillage

- Cuts a slit in the soil 2 feet down
- Does NOT invert the soil
- Minimal effect on microbial life
- Opens up soil to air and water flow

Why? Improves soil health through minimal disturbance of soil
1. Soil Health Improvement Activities

Practice: Using biological inoculants

- Bacteria fix nitrogen and solubilize phosphorous: Azotobacter
- Used as soil drench or foliar spray
- Once in the soil, they spread and “colonize” the soil

*Why*? Biological inoculants enhance the microbial life in the soil
Practice: Planting an orchard

Why? An orchard adds diversity to farm ecosystem- and is a great cash crop!

- Laying out tree spacing
- Close spacing: trees kept short

NRCS Practice # 490: Tree site preparation

- Buried line for sprinklers
- Each tree has own sprinkler
- Sprinklers irrigate cover crop